

## 6. THAMNOPHILUS CÆSIUS.

*Lanius cæsius*, Cuv. in Mus. Paris.

♂ *Nigro-plumbeus; pileo cristato gulaque nigris; tectricibus alaribus anguste albo limbatis; cauda nigricante unicolore; rostro pedibusque nigris.*

♀ *Grisescenti-brunnea, crista nigricante; capitis lateribus, tectricum alarum marginibus et corpore subtus rufis; rostro nigro, mandibula inferiore basi et pedibus pallidis.*

Long. tota 5·5, alæ 3·25, caudæ 2·25.

*Hab.* in Guiana Britannica. Mus. Parisiensi et P.L.S.

March 13.—Dr. Gray, F.R.S., Vice-President, in the Chair.

NOTES ON THE HABITS OF SOME INDIAN BIRDS. PART VIII.  
BY LIEUT. BURGESS.

Family STRUTHIONIDÆ.

Genus OTIS.

OTIS NIGRICEPS (Vigors). BLACK-HEADED BUSTARD.

This fine Bustard is found in flocks, varying in size, in the open plains of the Deccan, preferring the dry grassy and stony grounds to others. It grows to a large size; one fine male which I measured was 7 feet across the wings, and 46 inches from the tip of the beak to the end of the tail. This Bustard may almost be said to breed all the year round. I have had an egg brought to me in February, another on the 4th May, containing a young bird. A gentleman on the Revenue Survey told me that he had seen a young Bustard, covered with down, in the early part of October. I have had a young bird brought to me late in November, as well as eggs in November and December. The female generally lays but one egg. A. F. Davidson, Esq., Superintendent of the Ahmednuggur Revenue Survey, told me a curious habit of the male Bustard. He says, "About breeding time the male is fond of mounting some elevated spot, and then strutting about with the tail erected and spread, the wings drooping, and the pouch in the throat inflated with air, and looking like a large bladder; under the hillock where the male was thus displaying himself were several young ones." In corroboration of this, a boy told me on the 17th May 1850, that about four days previously he had seen a Bustard, with a white-looking bag hanging below the neck. I see in Dr. Jerdon's Catalogue, that he gives an extract from Mr. Elliot's notes to this effect; speaking of the cock Bustard, he says: "He was strutting about on some high ground, expanding his tail, ruffling his wings, and distending his neck and throat, making the feathers stand out like a ruff." I do not find it recorded that the large Bustard of Europe (*O. tarda*) has this habit of showing himself off during the breeding season. The egg of the Black-headed Bustard varies in size; the one sent with this paper measures  $3\frac{3}{10}$ ths in. in length, by  $2\frac{3}{10}$ ths in. in width. It also varies in colour; the

general colour is a brownish olive, dashed with pale brown. One egg which I had was of a nearly uniform palish blue. The egg now sent was found in a grassy spot on 18th December. As everything relating to this noble bird is interesting, I give a description of a young one brought to me on 28th December 1849. It stood about 10 inches in height; its beak was of a dirty whitish colour, nostrils large; irides clear pale hazel, and eyes very large; back mottled, very much as in the old birds, as also the wing feathers; front of the neck pale yellowish-brown, with a dark streak running down the sides; legs dull yellowish-white, feet the same, knee-joints very thick; there was down on the neck. This was quite a young bird, very feeble on its legs, and barely able to stand. The Black-headed Bustard utters, when frightened, a harsh barking note. Its flight is like that of the Heron, a steady flight, sustained by the continued flapping of its large wings.

#### OTIS AURITA (Lath.). FLORIKIN.

I have not met with the Florikin sufficiently often to allow me to enter into the argument as to whether the Black Florikin is the male bird in its breeding plumage, or a distinct species from the common brown Florikin, but Dr. Jerdon's arguments in his "Illustrations of Indian Ornithology," appear conclusive, that the black and brown are one and the same bird in different states of plumage. But this point might soon be set at rest, by sportsmen and ornithologists in India ascertaining whether the black-plumaged birds are ever met with during the cold weather and spring. That the male of the Little Bustard (*Otis tetrax*) should to a certain extent assume this black plumage during the breeding season, affords strong ground for the supposition that the Black Florikin is the male in his nuptial dress. The Florikin breeds during the end of the monsoon, laying three eggs of a dark olive-green colour, spotted and dashed with light brown,  $1\frac{2}{10}$ ths in. in length, by  $1\frac{5}{10}$ ths in. in width, the greatest width being about the centre. The egg now sent was procured with two others early in September. An officer, who was out shooting, put up a Florikin and killed it, and on going to the spot where she rose, found three eggs. I had two specimens of the Florikin sent to me, both males, one in beautiful black plumage on 2nd October, the other in the brown plumage on the 4th February.

#### Family COLUMBIDÆ.

#### Genus COLUMBA.

#### COLUMBA CENAS. BLUE PIGEON.

This Pigeon is very common in the Deccan, inhabiting holes in old forts, walls, temples and wells. It breeds during the cold season, laying two white eggs. Holes and ledges in wells are its favourite resorts for breeding. The egg measures  $1\frac{4}{10}$ ths in. in length, by 1 inch and nearly  $\frac{2}{10}$ ths in width, and is of a clear shining white. An egg is sent with this paper; it was taken from a well on the 8th December.

## Genus TURTUR.

## TURTUR CAMBAYENSIS.

Of this Dove, Dr. Jerdon says in his notes,—“This little dove abounds over most of India, both in low jungles and near villages and cantonments, being found, especially towards the north, in every garden, and frequenting stable-yards, houses, &c.” It is, I believe, the same as the small Dove to which—not knowing that it had been previously named—I gave the name of the Vinous-necked Turtle, on account of the colour of its neck. If this be the case, it breeds during the month of March, building its nest in low bushes, and laying two white eggs, rather more than  $\frac{9}{10}$ ths of an inch in length, by nearly  $\frac{8}{10}$ ths of an inch in breadth.

## TURTUR RISORIA.

This Dove is considerably larger than the last, and is easily distinguished by the white crescent on its neck, like the Wood Pigeon of this country. It abounds in every place; amongst the prickly-pear hedges and thickets near villages, in groves of babool trees, and bushes. Its half plaintive, half laughing note, is heard as soon as it becomes light, and if the trees over your tent happen to be its resort, it is anything but conducive to sleep. This Turtle breeds during the cold season, building in low babool trees; its nest is composed of a few twigs and pieces of grass. It lays two white eggs,  $1\frac{2}{8}$ ths in. in length, by rather more than  $\frac{9}{10}$ ths in width.

## Order GRALLATORES.

## Family ARDEADÆ.

## Genus GRUS.

## Subgenus ANTHROPOIDES (Vieillot).

## GRUS VIRGO. DEMOISELLE CRANE.

This Crane visits the Deccan during the cold weather, but sometimes remains as late as May. I saw a large flock of them on the river Seena, near Waterphul, as late as 24th May, and was told that one had been brought into the cantonments of Ahmednuggur as late as 12th June, but I never heard of any remaining to breed. It would be most interesting to find out their breeding haunts, their manner of nesting, and the number and colour of their eggs. The greater portion leave the Deccan at the end of March or beginning of April, and return at the end of November. They feed in the grain fields, retiring to the larger rivers about ten o'clock, where they may be seen standing in large flocks in the shallows.

## Genus ARDEA.

## Subgenus ARDEA.

## ARDEA CINEREA (Lath.). COMMON HERON.

A tolerably common bird in the Deccan, frequenting tanks and rivers. I found two nests in a tall peepul tree on the 27th February;

one contained the egg sent with this paper, the other was a nest just finished, and contained no eggs. This bird is considered, I believe, to be identical with the English Heron; it most probably therefore lays four or five eggs, as Mr. Yarrell states that the English Heron does. The egg is a uniform sea-green colour,  $2\frac{4}{10}$ ths in. in length, by 1 inch and rather more than  $\frac{7}{10}$ ths in width.

### MISCELLANEOUS.

*On the Mode in which the Tachinæ escape from their Pupa-cases and from closed situations in which they often occur.* By Dr. REISSIG.

AMONGST the phænomena of insect-life few things are more remarkable than the power possessed by soft, newly-developed flies, such as the *Tachinæ*, of breaking not only out of the hard larva-skin, but also out of the closed situations in which these are generally found, as, for instance, from the galleries and pupa-cells of *Saperda populnea* and *Cryptorhynchus lapathi* in wood, of *Tortrix resinana* in resinous galls, &c.

To explain this process it has often been supposed that the hardened larva-skin is softened by the insect when about to escape by means of fluid, or that the aperture was prepared by the larva before its change to the pupa state. The author however states, that according to his observations neither of these suppositions is correct; the margins of the aperture through which the fly escapes are evidently broken in a manner which could not be the case if the skin were softened by the agency of a fluid, and he was never able to detect any traces of a prepared means of exit. He has therefore come to the conclusion that the dried larva-skin is burst by the fly, and his observations have proved that this is done in the way which he describes as follows:—"The fly when about to escape can convert its head into a most wonderful apparatus, acting in the manner of a hydraulic press, and by this means not only burst its immediate envelope, but also overcome any obstacles which may lie in its way to the open air."

His observations were made on the following species of *Tachina*: *T. gilva*, Hrtg., from *Lophyrus pini*; *T. pilipennis*, Fall., from the resinous galls of *Tortrix resinana*; *T. flaviceps*, Rtzbg., from the pupæ of *Noctuæ*; *T. fera*, Linn., from the dried larva of *Noctua piniperda*, &c.; but especially upon *T. bimaculata*, Hrtg., from the cocoon of *Lophyrus pini*. His results are as follows:—

In *T. bimaculata* he first observed that both at the moment of its escape and for some time subsequently the fly possesses the power of converting the head into a nearly perfect globe, the diameter of which is considerably greater than that of the body.

The surface of the globe consists of the slightly translucent pergamentaceous skin, which is folded together very beautifully in the *Tachinæ* from the eyes to the mouth, and this is extended to the form described by a thin fluid.

The globe is so placed that the eyes form a solid part of it, and thus furnish a support for the whole apparatus.

Besides the two eyes the only visible external organs are: *a.* the last joints of the antennæ; *b.* the two horny, bowed palpiform organs of the mouth; and *c.* the proboscis. Everything else on the head, except the bristles of the antennæ and of the margins of the eyes, disappears, and all the visible organs exhibit a change of position. Thus the antennæ occur on the side of the globe opposite to the eyes, or quite in front. Only the last joint of each projects from the globular head, on the surface of which they form as it were a double hook directed downwards. They still however retain some power of movement, and the fly appears to employ them in various ways. The proboscis is directed obliquely backwards, below the eyes; it also retains some power of motion, and the fly can elongate or contract it at pleasure. It appears to be an important part of the apparatus, serving to press the globular head forwards, or rather to give it a firm support in the pressure which it exerts upon the obstacles before it.

The two horny palpiform organs which lie between the antennæ and the mouth are also of importance in these operations. They form a pair of hooks turned downwards and resting with their convex sides against the globular head, so that as this expands their extremities are pressed into the larva-skin, where they produce the commencement of the transverse cleft of the aperture, which is afterwards completed by the general expansion of the head.

Besides this transverse cleft in the larva-skin, there is usually a second crack running from the apex and dividing the cap which is thrown off, into two nearly equal portions: this is produced by the wedge-like action of the antennæ.

When the expansion of the head has reached its maximum, it is maintained for a few seconds, and then the head again contracts; but if it has not done its business sufficiently, it is again dilated until the desired result is obtained. In this way the author observed that a *Tachina* which he had enclosed in a narrow glass tube, tried more than a hundred times to expel the cork by the expansion of its head.

The expansion of the head commences by a prolongation of the front of the face between the angles of the eyes: this forms a conical point, having the antennæ at its apex. The object of this is sufficiently apparent: the fly can introduce this point into small holes and crevices in the obstacles which interpose between it and the open air; these are then enlarged by the globular expansion of the head, which is doubtless retained in its situation by the action of the antennæ.—*Wiegmann's Archiv*, xxi. p. 189.

*On the apparent Absence of a Nervous System in the Nemoptera lusitanica.* By M. LÉON DUFOUR.

The author states that in examining numerous specimens of the *Nemoptera lusitanica*, a species of Neuropterous insect abundant in Spain and Portugal, he was unable to find any trace of a nervous

system. The head when opened, instead of presenting a distinct brain or cephalic ganglia, only contained a small quantity of an amorphous and liquid pulp. In the thorax also, the large nerves passing into the femora could not be detected. M. Graells of Madrid was likewise unable to discover any traces either of ganglia or nerves.

M. Léon Dufour states that the tracheæ are not plentiful, so that the respiration cannot be very energetic, and the locomotive power of the animal is therefore small. In the structure of the alimentary organs, the *Nemoptera* differs from the *Panorpidæ*, in which family it has usually been placed, and M. Léon Dufour thinks that its food is of a fluid nature.—*Comptes Rendus*, Dec. 31, 1855, p. 1204.

METEOROLOGICAL OBSERVATIONS FOR FEB. 1856.

*Chiswick*.—February 1. Light clouds : frosty. 2. Cloudy. 3. Frosty : fine throughout. 4. Overcast : slight rain. 5. Very fine : boisterous at night. 6. Densely clouded : boisterous. 7. Uniformly overcast : rain. 8. Densely overcast : fine : cloudy. 9. Exceedingly fine. 10. Cloudy. 11. Foggy : rain : overcast. 12. Rain : fine : rain at night. 13. Rain : showery throughout. 14. Rain : fine. 15. Cloudy : very fine : foggy at night. 16. Foggy : very fine : foggy. 17. Hazy : overcast : foggy at night. 18. Overcast : slight snow. 19. Hazy : cold and raw. 20. Cloudy and cold throughout. 21. Slight rain : small hail occasionally. 22. Overcast : slight rain. 23. Fine throughout : cloudy at night. 24. Fine : overcast : clear and frosty. 25. Overcast throughout. 26. Cloudy : slight rain. 27. Overcast. 28. Very slight drizzle : overcast : cloudy. 29. Foggy : cloudy : frosty.

|  |             |
|--|-------------|
| Mean temperature of the month .....                      | 41°·54      |
| Mean temperature of Feb. 1855 .....                      | 28·01       |
| Mean temperature of Feb. for the last thirty years ..... | 38·71       |
| Average amount of rain in Feb. ....                      | 1·543 inch. |

*Boston*.—Feb. 1—3. Fine. 4, 5. Cloudy. 6. Rain A.M. and P.M. 7, 8. Cloudy : rain A.M. 9. Cloudy. 10. Cloudy : rain A.M. 11. Cloudy : rain P.M. 12. Rain A.M. 13. Cloudy : rain P.M. 14, 15. Fine. 16—22. Cloudy. 23, 24. Fine. 25—28. Cloudy. 29. Foggy.

*Sandwick Manse, Orkney*.—Feb. 1. Cloudy A.M. : showers, thaw P.M. 2. Cloudy A.M. : fine P.M. 3. Fine, bright A.M. : fine, clear P.M. 4. Fine, cloudy A.M. : fine, clear P.M. 5. Fine, drops A.M. : fine, cloudy P.M. 6. Bright A.M. : rain P.M. 7. Bright A.M. : showers P.M. 8. Cloudy A.M. and P.M. 9. Drops A.M. : clear P.M. 10. Bright A.M. : clear, showers P.M. 11. Bright A.M. : clear, fine P.M. 12. Rain A.M. : showers P.M. 13. Bright A.M. : cloudy P.M. 14. Snow-showers A.M. : showers P.M. 15. Rain A.M. : cloudy P.M. 16. Drizzle, showers A.M. : drizzle P.M. 17. Damp A.M. and P.M. 18. Cloudy A.M. and P.M. 19. Cloudy, frost A.M. : clear, fine P.M. 20. Bright A.M. : cloudy, fine P.M. 21. Bright A.M. : clear P.M. 22. Bright A.M. : showers, clear P.M. 23. Bright A.M. : cloudy P.M. 24. Cloudy A.M. : clear P.M. 25. Rain A.M. : showers, clear, aurora P.M. 26. Cloudy A.M. : drizzle P.M. 27. Showers A.M. : fine, cloudy P.M. 28. Drizzle A.M. : damp P.M. 29. Cloudy A.M. and P.M.

|   |              |
|---|--------------|
| Mean temperature of Feb. for previous twenty-nine years ...     | 38°·01       |
| Mean temperature of this month .....                            | 40·84        |
| Mean temperature of Feb. 1855 .....                             | 31·64        |
| Average quantity of rain in Feb. for fifteen previous years ... | 3·25 inches. |

The storm which raged so violently in the South of Scotland on the 6th and 7th did not reach Orkney or the North of Scotland, but again we had this month as well as during the gale of last month a great fall of the barometer, which stood at 28·49 on the 6th at midnight.

*Meteorological Observations made by Mr. Thompson at the Garden of the Horticultural Society at CHISWICK, near London; by Mr. Veall, at Boston; and by the Rev. C. Clouston, at Sandwick Manse, ORKNEY.*

| Days of Month. | Barometer. |        |                   |        | Thermometer. |       |                   |        | Wind.               |         |                   | Rain.     |         |                   |       |
|----------------|------------|--------|-------------------|--------|--------------|-------|-------------------|--------|---------------------|---------|-------------------|-----------|---------|-------------------|-------|
|                | Chiswick.  |        | Orkney, Sandwick. |        | Chiswick.    |       | Orkney, Sandwick. |        | Chiswick.<br>1 p.m. | Boston. | Orkney, Sandwick. | Chiswick. | Boston. | Orkney, Sandwick. |       |
|                | Max.       | Min.   | 8 a.m.            | 8 p.m. | Max.         | Min.  | 8 a.m.            | 8 p.m. |                     |         |                   |           |         |                   |       |
| 1856.<br>Feb.  |            |        |                   |        |              |       |                   |        |                     |         |                   |           |         |                   |       |
| 1.             | 30'136     | 30'051 | 29'81             | 29'93  | 29'84        | 29'55 | 37                | 38½    | w.                  | w.      | wnw.              | .....     | .....   | .....             | '02   |
| 2.             | 30'001     | 29'968 | 29'66             | 29'85  | 29'91        | 29    | 35                | 35½    | w.                  | nw.     | w.                | .....     | .....   | .....             | '36   |
| 3.             | 30'025     | 30'011 | 29'77             | 29'88  | 29'84        | 25    | 40                | 32     | se.                 | se.     | calm              | .....     | .....   | .....             | ..... |
| 4.             | 29'995     | 29'952 | 29'66             | 29'75  | 29'72        | 42    | 32                | 36½    | sw.                 | s.      | e.                | '01       | .....   | .....             | ..... |
| 5.             | 30'137     | 30'093 | 29'74             | 29'68  | 29'42        | 42    | 41                | 42½    | sw.                 | sw.     | sw.               | .....     | .....   | .....             | ..... |
| 6.             | 29'927     | 29'612 | 29'45             | 29'21  | 28'75        | 50    | 47                | 42½    | sw.                 | sw.     | e.                | '02       | .....   | .....             | '05   |
| 7.             | 29'912     | 29'662 | 29'24             | 29'19  | 29'18        | 56    | 47                | 47½    | sw.                 | sw.     | s.                | '06       | .....   | .....             | '23   |
| 8.             | 30'038     | 29'986 | 29'50             | 29'34  | 29'45        | 40    | 45                | 46½    | sw.                 | sw.     | sw.               | '02       | .....   | .....             | '16   |
| 9.             | 29'972     | 29'909 | 29'50             | 29'42  | 29'44        | 60    | 45                | 44     | sw.                 | sw.     | w.                | .....     | .....   | .....             | ..... |
| 10.            | 29'962     | 29'923 | 29'60             | 29'62  | 29'75        | 54    | 41                | 46½    | sw.                 | sw.     | w.                | '03       | .....   | .....             | '01   |
| 11.            | 29'861     | 29'810 | 29'50             | 29'78  | 29'81        | 53    | 42                | 44     | s.                  | sse.    | sw.               | .....     | .....   | .....             | ..... |
| 12.            | 29'737     | 29'375 | 29'31             | 29'73  | 29'60        | 50    | 43                | 40     | sw.                 | sw.     | e.                | '20       | '15     | .....             | '03   |
| 13.            | 29'773     | 29'685 | 29'40             | 29'79  | 29'79        | 53    | 43                | 45     | sw.                 | sw.     | e.                | '05       | '42     | .....             | '09   |
| 14.            | 29'739     | 29'709 | 29'30             | 29'58  | 29'51        | 54    | 40                | 47     | sw.                 | sw.     | e.                | '20       | '02     | .....             | '01   |
| 15.            | 29'773     | 29'726 | 29'34             | 29'60  | 29'77        | 55    | 32                | 41½    | sw.                 | sw.     | e.                | '02       | '26     | .....             | '05   |
| 16.            | 29'841     | 29'765 | 29'47             | 29'80  | 29'83        | 54    | 32                | 42½    | sw.                 | sw.     | e.                | .....     | .....   | .....             | '06   |
| 17.            | 29'843     | 29'831 | 29'58             | 29'85  | 29'94        | 43    | 34                | 41     | e.                  | e.      | ese.              | .....     | .....   | .....             | '28   |
| 18.            | 29'762     | 29'707 | 29'55             | 29'55  | 30'11        | 36    | 33                | 34½    | e.                  | e.      | e.                | '01       | .....   | .....             | ..... |
| 19.            | 29'867     | 29'753 | 29'54             | 30'16  | 30'17        | 42    | 32                | 35     | ne.                 | ne.     | ne.               | .....     | .....   | .....             | ..... |
| 20.            | 29'908     | 29'841 | 29'62             | 30'13  | 30'28        | 38    | 32                | 34     | ne.                 | ne.     | calm              | .....     | .....   | .....             | ..... |
| 21.            | 30'054     | 29'916 | 29'77             | 30'22  | 30'02        | 37    | 28                | 33     | ne.                 | ne.     | wnw.              | '01       | .....   | .....             | ..... |
| 22.            | 30'047     | 29'976 | 29'70             | 29'95  | 29'90        | 43    | 27                | 34     | nw.                 | nw.     | wnw.              | '01       | .....   | .....             | ..... |
| 23.            | 30'229     | 30'017 | 29'70             | 30'01  | 30'08        | 50    | 27                | 37½    | ll.                 | w.      | w.                | .....     | .....   | .....             | '03   |
| 24.            | 30'458     | 30'362 | 30'00             | 30'12  | 30'16        | 50    | 25                | 36     | sw.                 | w.      | sw.               | .....     | .....   | .....             | '01   |
| 25.            | 30'467     | 30'406 | 30'07             | 29'88  | 29'81        | 47    | 41                | 41½    | sw.                 | w.      | w.                | .....     | .....   | .....             | '20   |
| 26.            | 30'369     | 30'314 | 29'87             | 29'94  | 30'06        | 57    | 45                | 47     | sw.                 | w.      | sw.               | '01       | .....   | .....             | '05   |
| 27.            | 30'473     | 30'394 | 29'99             | 30'18  | 30'18        | 51    | 42                | 47½    | nw.                 | wnw.    | sw.               | .....     | .....   | .....             | '04   |
| 28.            | 30'183     | 30'463 | 30'10             | 30'22  | 30'36        | 49    | 36                | 47     | ll.                 | sw.     | sw.               | '01       | .....   | .....             | '03   |
| 29.            | 30'590     | 30'473 | 30'13             | 30'40  | 30'45        | 52    | 28                | 40     | ne.                 | ll.     | sw.               | .....     | .....   | .....             | ..... |
| Mean.          | 30'037     | 29'951 | 29'65             | 29'835 | 29'832       | 48'20 | 34'89             | 40'1   | 41'51               | 40'17   | 0'63              | 1'00      | 2'42    |                   |       |

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XXXII.—*On the British Species of Arctium.*  
By CHARLES C. BABINGTON, M.A., F.R.S. &c.\*

IN a former paper (Ann. Nat. Hist. Ser. 1. iv. 253) I endeavoured to show that there were two well-marked species of *Arctium* inhabiting Britain, and then expressed an opinion that neither of them accorded well with the plants figured in 'English Botany.' The names applied to them in that paper were *A. Lappa* and *A. Bardana*, used in the belief that my plants corresponded with those so called by Linnæus and Willdenow. Since that period my attention has at intervals been directed to the genus, and specimens have been often seen that did not well accord with either of those species. A few years since I was favoured by my friend M. J. Lange of Copenhagen with a specimen of a plant called by him *A. intermedium*, and which he believes to be distinct from the described species. On the supposition that this accorded with a plant observed in Britain, and that it was nearly allied to what I had formerly named *A. Bardana*, it is placed in the 3rd edition of my 'Manual' as *A. minus*  $\beta$ . *intermedium*, and the *A. Bardana* of Smith is incorrectly referred to it. A careful re-examination of the plants has led me to the conclusion that throughout the whole of these researches I have been in error, and that the following remarks present a more correct view of the subject.

We appear to possess five well-marked species of *Arctium* in this country, namely *A. tomentosum*, *A. majus*, *A. intermedium*, *A. minus*, and *A. pubens*, the characters of which I now purpose endeavouring to point out. But before describing the plants it

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is desirable to direct attention to the points upon which it seems probable that stress may be best laid. (1.) The arrangement of the heads presents an easy mode of separating two of the species from the others. This character must be used cautiously, for it is only the top of the central stem of the plant that is to be trusted: it and the branches often have the heads arranged in the same manner, but frequently the central stem bears a corymb and the branches racemes of heads. (2.) The form of the heads is of much value, and their size must not be neglected. (3.) Although the shape of the phyllaries is nearly the same in all the plants, their direction is a little different and the appearance of the heads is thereby changed. The inner row has not this uniformity of shape, but differs considerably in the several plants. These inner phyllaries are always bordered by a broadish membrane which sometimes increases in width towards the top, but in other cases narrows gradually to a rigid point. (4.) The florets consist of two parts, the upper of which is tubular nearly throughout. That part which is below the commencement of the free filaments is slender in all the species; the upper part is always much thicker, varies considerably in form, and its length bears different proportions to that of the lower part. (5.) The phyllaries either fall short of the florets or equal them. In the latter case the corolla alone is to be taken into account, for the anthers and styles are always much protruded.

It is proper to state here the reasons which have led me to retain the name of *Arctium* for this genus instead of following DeCandolle in employing it for the *A. lanuginosum* (Lam.). Linnæus in his first work (Syst. Nat. published in 1731) gave the name of *Arctium* to the plant called *Lappa* by Tournefort, and characterized it as early as the year 1737 (Gen. Pl.). In 1778 Lamarck transferred the name, under the form of *Arction*, to his *A. lanuginosum* without paying the least attention to its previous use by Linnæus, and applied the term *Lappa* to the Linnæan genus. It is doubtless true that the ante-Linnæan botanists did use *Lappa* as a generic name, but it has been well remarked by the Committee of the 'British Association for the Advancement of Science' appointed to consider the nomenclature of zoology, that "Linnæus was the first to attach a definite value to genera, and to give them a systematic character by means of exact definitions; and therefore, although the names used by previous authors may often be applied with propriety to modern genera, yet in such cases they acquire a new meaning and should be quoted on the authority of the first person who used them in this secondary sense" (Report Brit. Assoc. Manchester, 1842, p. 110). Applying this excellent rule, which is just as true in botany as in zoology, to the present case, we find

that the Linnæan name has a priority of many years over that which Lamarck adopted from the ante-Linnæan Tournefort. That this was the view taken at the time is shown by the remarks of Villars (Pl. des Dauph. iii. 27) when continuing to use the name of *Berardia*, which he had given in his 'Prospectus' to the *A. lanuginosum* of Lamarck. There does not seem to be any reason for breaking the rule in this instance, for if it should be said that Tournefort's genera are well defined and therefore should not be rejected, then many more of his names ought to have been adopted in preference to those given by Linnæus.

1. *A. tomentosum* (Pers.) ; heads subcorymbose long-stalked spherical and closed in fruit much webbed (purplish), phyllaries falling short of the florets subulate, inner row longest and broad, inflated upper part of florets a little shorter than the lower part.

*A. tomentosum*, Pers. Syn. ii. 383 (1807) ; Schkuhr, Handb. iii. 29. t. 227.

*A. Bardana*, Willd. Sp. Pl. iii. 1632 (1800) ; Eng. Bot. t. 2478 ; Fries, Nov. Fl. Suec. ed. 2. 263.

*A. Lappa*  $\beta$ , Linn. Fl. Suec. ed. 2. 278, teste Fries, l. c.

*A. Lappa*, Sven. Bot. t. 63 ; Fl. Dan. t. 642.

*Lappa tomentosa*, Lam. Dict. i. 377 (1783) ; All. Fl. Ped. i. 144 (1785) ; Gray, Brit. Pl. ii. 434 ; Lindl. Syn. ed. 1. 154 ; DeCand. Prod. vi. 661 ; Koch, Syn. ed. 2. 463 ; Gren. et Godr. Fl. Fr. ii. 281 ; Reichenb. Icon. Fl. Germ. xv. t. 811 ; Fl. Dan. t. 2423.

*Lappa major montana*, capitulis tomentososis sive *Arctium Dioscoridis*, Raii Syn. ed. 3. 197. 4 ; Pet. Brit. Pl. t. 23. 6.

Stem and petioles slightly mealy and floccose. Stem 3 to 5 feet high. Leaves cordate-ovate ; lowermost very large. Erect central stem and usually most of the branches ending in irregular corymbs of heads ; but sometimes many of the branches have fewer heads with a racemose arrangement. Peduncles very long, but rarely a few of the lower heads have only short stalks. Heads large, usually covered with much cobweb-like hair ; occasionally a plant with almost glabrous heads is found. Phyllaries purplish-green or greenish-purple, each with a small strongly hooked purplish-yellow rigid point ; inner row broad and membranous even near to the end which is purple often quite blunt truncate or emarginate with a straight rigid excurrent nerve or rarely shortly subulate. Florets broadest just above the origin of the free filaments at which point they suddenly enlarge from a slender tube, become inflated and then narrow upwards, very persistent with the ripening fruit when they close the small space left between the ends of the converging phyllaries. Fruit dark brown with blackish blotches, nearly smooth.

It is probable that the long delay that has attended the acknowledgement by name of this plant by English botanists, although it was figured by Sowerby, may have been caused by its inhabiting the eastern districts of England, and being rarely, if ever, to be found in other parts of the country. Experience must prove or disprove this idea. The plant really represented in 'English Botany' not having been seen, any woolly-headed *Arctium* was called *A. Bardana*. The *A. minus*, which possesses many of the characters of *A. tomentosum*, being figured in the same work under the name of *A. Lappa*, the conclusion was arrived at that *A. Lappa* and *A. Bardana* formed only one species. For if tab. 2478 is a representation of the plant commonly called *A. Bardana* in England, then its difference from the specimens generally found and so named would show that there is so great a range of variation in the species as to render it highly probable that the *A. Lappa* of tab. 1228 is another of its states. If the true *A. Lappa* of Willdenow had been figured in that valuable work, no such idea would probably have arisen.

In most respects Sowerby's figure is an excellent representation of *A. tomentosum*, but the drawing was probably taken from a lateral branch, and the relative length of the phyllaries and florets (as shown in the dissected figure) does not appear to be correct. The inflated form of the floret is excellently shown.

The *A. Lappa* (Willd.) not being presented to the notice of our botanists, but that name given by Smith to *A. minus*, caused the erroneous conclusions that only a single variable species existed in Britain, and also, that there were no more species upon the European continent.

Although Fries informs us that the *A. minus* (Schkuhr) is the true *A. Lappa a.* of Linnæus, a statement confirmed by the specimen in his herbarium, still the var.  $\beta$ . (Linn.), which we know on the same excellent authority is the plant called *A. tomentosum* by Persoon and *A. Bardana* by Willdenow, is figured in the 'Svensk Botanik' (tab. 63) and 'Flora Danica' (tab. 643) as *A. Lappa*.

It is proper to direct attention to the fact that Gray (*l. c.*) and Lindley (*l. c.*) correctly identified the plant of Sowerby as *A. tomentosum*, but neither of them seems to have known that there are two other woolly-headed species in this country.

I have not observed this plant out of Cambridgeshire, but it is probably much more extensively distributed.

Flowering in August.

2. *A. majus* (Schkuhr); heads subcorymbose long-stalked hemispherical and open in fruit glabrous (green), phyllaries equaling or exceeding the florets subulate, inner row shorter than